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10/810,203	03/26/2004	Ho Yong Kang	2013P160	8669
8791	7590	03/06/2007	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			KIM, DAVID S	
			ART UNIT	PAPER NUMBER
			2613	
SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/810,203	KANG ET AL.
	Examiner David S. Kim	Art Unit 2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 26 March 2004 and 31 August 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-12 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-12 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 26 March 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
 5) Notice of Informal Patent Application
 6) Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

In claims 7-8 and 11-12, the peak value sensor and the error amplifier are not shown in the figures.

2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 5-7** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, notice the following limitation in claim 5 (claims 6-8 also include this limitation by their dependence on claim 5):

“The burst mode optical receiver of claim 1, wherein the post amplifier comprises *a series of sets*, **each of the sets** comprising:

a limiting amplifier which amplifies **the differential signals** and cancels offsets inherited from **the differential signals**” (emphasis Examiner’s).

Notice that “the differential signals” in claim 5 refer to the “differential signals” from the “single-to-differential converter” of parent claim 1. The language of claim 5 introduces “a series of sets”, and “**each of the sets**” comprises a limiting amplifier that amplifies these “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. However, Applicant’s disclosure (Fig. 6 and the corresponding specification on p. 6) appears to indicate that **only** the first set comprises a limiting amplifier that amplifies “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. That is, although the sets after this first set also comprise a limiting amplifier that amplifies “differential signals” and cancels offsets inherited from “differential signals”, **only** the first set comprises a limiting amplifier that amplifies “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. Otherwise, it would appear that **each of these sets** would be connected to the “single-to-differential converter” of parent claim 1 *in parallel*, not in a *cascaded series* as indicated by Applicant’s Fig. 6 and p. 6, l. 3-9 of Applicant’s specification.

As a remedy, Examiner respectfully suggests that Applicant amend the claim language of claim 5 to clarify the antecedent references to the “differential signals” from the “single-to-differential converter” and antecedent references to any other “differential signals” that may be part of the invention.

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5. **Claims 9-12** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, notice the following limitation in claim 9 (claims 10-12 also include this limitation by their dependence on claim 9):

“The burst mode optical receiver of claim 1, wherein the post amplifier comprises *cascaded sets*, **each of the sets** comprising:

a first limiting amplifier which amplifies *the differential signals output from the single-to-differential converter* and cancels the offsets inherited from *the differential signals*” (emphasis Examiner’s).

Notice that “the differential signals” in claim 9 refer to the “differential signals” from the “single-to-differential converter” of parent claim 1. The language of claim 5 introduces “cascaded sets”, and “**each of the sets**” comprises a first limiting amplifier that amplifies these “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. However, Applicant’s disclosure (Fig. 7 and the corresponding specification on p. 6) appears to indicate that **only** the first set comprises a first limiting amplifier that amplifies “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. That is, although the sets after this first set also comprise a first limiting amplifier that amplifies “differential signals” and cancels offsets inherited from “differential signals”, **only** the first set comprises a limiting amplifier that amplifies “**differential signals**” from the “single-to-differential converter” of parent claim 1 and cancels offsets inherited from these “**differential signals**” from the “single-to-differential converter” of parent claim 1. Otherwise, it would appear that **each of these sets** would be connected to the “single-to-differential converter” of

parent claim 1 *in parallel*, not in a *cascaded series* as indicated by Applicant's Fig. 6 and p. 6, l. 23-25 of Applicant's specification.

As a remedy, Examiner respectfully suggests that Applicant amend the claim language of claim 9 to clarify the antecedent references to the "differential signals" from the "single-to-differential converter" and antecedent references to any other "differential signals" that may be part of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by Ono (U.S. Patent Application Publication No. US 2002/0109075 A1).

Regarding claim 1, Ono discloses:

A burst mode optical receiver (e.g., Fig. 41) comprising:

a photodiode which converts an input optical signal into a current signal (PD);

a pre-amplifier which converts the current signal into a voltage signal (IV);

a single-to-differential converter which converts the single voltage signal output from the pre-amplifier into differential signals (AMP);

a post amplifier which amplifies the differential signals and cancels an offset occurring during the amplification or offsets inherited from the differential signals (DAMP and VOS); and

a discriminator which discriminates data from the differential signals (CMP).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. **Claims 2-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono, as applied to claim 1 above, and further in view of Ide et al. (U.S. Patent No. 5,955,921, hereinafter “Ide”).

Regarding claim 2, Ono does not expressly disclose:

The burst mode optical receiver of claim 1, wherein the single-to-differential converter comprises a differential amplifier which receives a predetermined reference voltage as a first input and the single voltage signal as a second input to output symmetrical differential signals.

However, such a structure is known in the art, as shown by the automatic threshold control (ATC) circuit of Ide (Fig. 30). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to include an ATC circuit in the single-to-differential converter of Ono. One of ordinary skill in the art would have been motivated to do this to provide a wide dynamic range (Ide, col. 2, l. 25-26), which enables the receiver of Ono to follow variations in the level of the input signal (Ide, col. 2, l. 20-24).

Regarding claim 3, Ono in view of Ide discloses:

The burst mode optical receiver of claim 2, wherein the single-to-differential converter further comprises an auto threshold controller (Ide, 102 in Fig. 30) which detects maximum and minimum levels (Ide, peak and bottom detecting circuits) of the single voltage signal and provides a substantial middle value of the maximum and minimum levels as a first input to the differential amplifier (Ide, “intermediate value” in col. 2, l. 4-9).

Regarding claim 4, Ono in view of Ide discloses:

The burst mode optical receiver of claim 3, wherein the auto threshold controller comprises:

a top holder which detects the maximum level of the single voltage signal and holds the maximum level for a predetermined period of time (Ide, peak detecting circuit in Fig. 30);

a bottom holder which detects the minimum level of the single voltage signal and holds the minimum level for a predetermined period of time (Ide, bottom detecting circuit in Fig. 30); and

a voltage divider which detects the substantial middle value of the maximum and the minimum levels (Ide, voltage dividing circuit in Fig. 30).

11. **Claims 5-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono, as applied to claim 1 above, and further in view of Hatakeyama et al. (U.S. Patent No. 6,018,407, hereinafter "Hatakeyama").

Regarding claim 5, Ono does not expressly disclose:

The burst mode optical receiver of claim 1, wherein the post amplifier comprises a series of sets, each of the sets comprising:

a limiting amplifier which amplifies the differential signals and cancels offsets inherited from the differential signals or an offset occurring during the amplification according to a predetermined control signal; and

a cascaded set of a plurality of auto-offset cancellation portions which calculates a difference between outputs of the limiting amplifier, amplifies the difference, and provides the amplification result as the predetermined control signal to the limiting amplifier.

However, such a structure is known in the art, as shown by the offset compensating amplifying circuits of Hatakeyama (e.g., amplifiers after PRE in Fig. 7). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to such offset compensating teachings in the post amplifier of Ono. One of ordinary skill in the art would have been motivated to do this since doing so would compensate (Hatakeyama, col. 1, l. 1. 48-51) the offset from differential amplifiers/signals, such as the differential amplifier(s)/signals of Ono (Ono, DAMP in Fig. 41).

Regarding claim 6, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 5, wherein the limiting amplifier is a differential amplifier (Hatakeyama, notice the positive-phase and negative-phase output signals from limiter amplifiers LIM) that operates in a linear region (amplifiers commonly operate in a linear region).

Regarding claim 7, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 6, wherein the auto-offset cancellation portions comprises:

a peak value sensor which detects the maximum or minimum levels from the outputs of the limiting amplifier (e.g., Hatakeyama, PD(1)P or PD(1)N in Fig. 7); and

an error amplifier which amplifies the difference between the maximum or minimum levels (e.g., Hatakeyama, AMP(1) in Fig. 7).

Regarding claim 8, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 5, wherein the auto-offset cancellation portions comprises:

a peak value sensor which detects the maximum or minimum levels from the outputs of the limiting amplifier (e.g., Hatakeyama, PD(1)P or PD(1)N in Fig. 7); and

an error amplifier which amplifies the difference between the maximum or minimum levels (e.g., Hatakeyama, AMP(1) in Fig. 7).

Regarding claim 9, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 1, wherein the post amplifier comprises cascaded sets, each of the sets comprising:

a first limiting amplifier (e.g., Hatakeyama, LIM(1) in Fig. 7) which amplifies the differential signals output from the single-to-differential converter and cancels the offsets inherited from the differential signals or the offset occurring during the amplification according to the predetermined control signal (Hatakeyama, offset compensation in LIM(1));

an auto offset cancellation portion (e.g., Hatakeyama, PD(1)P and PD(1)N and AMP(1) and summers in Fig. 7) which calculates a difference between the outputs of the first limiting amplifier,

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amplifies the difference (Hatakeyama, AMP(1)), and provides the amplification result as the predetermined control signal to the first limiting amplifier (Hatakeyama, summers); and a second limiting amplifier (e.g., Hatakeyama, LIM(2)) which amplifies differential signals output from the first limiting amplifier.

Regarding claim 10, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 9, wherein the first or second limiting amplifier is a differential amplifier (Hatakeyama, notice the positive-phase and negative-phase output signals from limiter amplifiers LIM) that operates in a linear region (amplifiers commonly operate in a linear region).

Regarding claim 11, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 10, wherein the auto-offset cancellation portion comprises:

a peak value sensor which detects the maximum and minimum levels from the outputs of the first limiting amplifier (e.g., Hatakeyama, PD(1)P or PD(1)N in Fig. 7); and an error amplifier which amplifies a difference between the maximum and minimum levels (e.g., Hatakeyama, AMP(1) in Fig. 7).

Regarding claim 12, Ono in view of Hatakeyama discloses:

The burst mode optical receiver of claim 9, wherein the auto-offset cancellation portion comprises:

a peak value sensor which detects the maximum and minimum levels from the outputs of the first limiting amplifier (e.g., Hatakeyama, PD(1)P or PD(1)N in Fig. 7); and an error amplifier which amplifies a difference between the maximum and minimum levels (e.g., Hatakeyama, AMP(1) in Fig. 7).

Conclusion

12. The references made of record and not relied upon are considered pertinent to applicant's disclosure. Ide et al. (U.S. Patent No. 5,923,219) is cited to show a related optical receiver with an auto threshold controller (e.g., Fig. 4). Hatakeyama et al. (U.S. Patent No. 6,081,362) is cited to show a related optical receiver with a post amplifier that compensates an offset (Fig. 2). Ide et al. (U.S. Patent No.

6,292,058 B1) is cited to show a related optical receiver with an auto threshold controller (e.g., Fig. 42).

Ide (U.S. Patent No. 6,587,004 B2) is cited to show a related optical receiver with an auto threshold controller (e.g., Fig. 2). Chen et al. (U.S. Patent No. 7,132,882 B2) is cited to show a related optical receiver with a post amplifier that compensates an offset (e.g., Fig. 5). Ide et al. (EP 1 006 653 A3) is cited to show a search report with further related references. Nagahori et al. ("An analog front-end chip set employing an electro-optical mixed design on SPICE for 5-Gb/s/ch parallel optical interconnection") is cited to show a related optical receiver with an auto threshold controller and to show offsets in an amplifier chain (Fig. 11).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK



KENMETH VANDERPUYE
SUPERVISORY PATENT EXAMINER